

# PATENT SPECIFICATION

1,051,064

DRAWINGS ATTACHED.

1,051,064



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## COMPLETE SPECIFICATION.

### Improvements in or relating to Rotary Pumps.

I, DEREK EYRE KIRKLAND, a British Subject, of 9 Lawrence Road, South Norwood, London, S.E.25, do hereby declare the invention, for which I pray that a patent may 5 be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to rotary pumps 10 and in particular to rotary pumps of the kind having a rotatable shaft extending outwardly through a bearing in a pump casing and having means for effecting a seal around the shaft where it leaves the casing.

According to the invention a rotary 15 pump of the above kind has said means located wholly outside the compass of the casing and comprising a separable cap attached to the casing and through which the shaft projects, which cap houses and supports flexible sealing means having two annular sealing lips of which one is urged by fluid pressure from within the pump into sealing engagement with the shaft outside the casing and the other is urged by the fluid pressure into sealing engagement with the outside surface of the casing around the shaft.

Preferably the sealing engagement with 20 the casing is against a face thereof perpendicular to the axis of the shaft.

The invention also provides a rotary 25 pump of the kind comprising a stator having inlet and outlet ports, a rotor eccentrically mounted in the stator, an input shaft connected to the rotor and extending outwardly through a bearing in the stator, means for effecting a seal around the shaft where it leaves the stator and a vane 30 received within a diametral slot in the rotor, the diametrically opposite edges of the vane being in contact with the interior

surface of the stator and the vane thereby 45 sweeping the space between the stator and the rotor during rotation of the rotor, to draw fluid through the inlet port and to expel it through the outlet port which 50 pump is characterised in that the sealing means are located wholly outside the compass of the stator and comprise a separable cap 55 attached to the stator and through which the shaft projects, which cap houses and supports flexible sealing means having two annular sealing lips of which one is urged by fluid pressure from within the pump into sealing engagement with the shaft outside the casing and the other is urged by the fluid pressure into sealing engagement with the outside surface of the casing around the shaft.

A specific example of a rotary pump 60 according to the invention will now be described with reference to the accompanying drawings in which:—

Figure 1 is a longitudinal section through 65 the pump;

Figure 2 is a front elevation of the pump 70 illustrated in Figure 1, with the front cover removed; and

Figure 3 is an enlarged view of a detail 75 of Figure 1.

In this example the rotor 11 of the pump 80 is of cylindrical form and has two recesses 12 on one of its end faces, the recesses being separated from each other by a central boss 13 and two radial ribs 14 in aligned relation which connect the boss to the rim 15 of the rotor. In this face of the rotor 11 is formed a diametral slot 16 which extends longitudinally through the ribs 14 and diametrically through the boss 13 and opens at each end on the periphery of the 85 rotor. In the slot 16 is slidable a vane 17 of rectangular section, the length of the

[Price 4s. 6d.]

vane being equal to the diameter of the bore of the stator 18 in which the rotor 11 is eccentrically mounted. In the periphery of the rotor 11 depressions 19 and 20 are formed in advance of the leading faces of the projecting ends of the vane 17. To the boss 13 of the rotor 11 is attached a stub shaft 21 by means of screws 22 while to the opposite end face of the rotor is attached a driving shaft 23. The shaft 23 may be integrally formed with the rotor 11 as shown or it may be formed separately therefrom and attached thereto in any suitable manner.

15 The stator 18 in which the rotor 11 is housed, is of hollow form having one of its ends closed while a detachable cover 24 is attached to its opposite end. The driving shaft 23 projects from the casing 18 through a projecting sleeve 40 formed on the end of the casing. The sleeve 40 has a plain bearing 41 for the shaft which extends to lie flush with the flat end face of the sleeve.

20 25 Two rings 42 made of material marketed under the trade mark "Polypac" separated by a washer 44 are slid on to the shaft and a metal cap 43 fits over the rings and is fixed to the casing.

30 35 The arrangement of the rings 42 and the cap 43 is shown in detail in Figure 3. Each ring has two annular lips 45 and 46. When fluid pressure is applied to the lips from within the casing the pressure acting on the lips 46 seals the rings to the shaft and fluid pressure acting on the lips 45 seals the rings to the end face of the sleeve 40 and the washer 44 respectively. In this way an effective seal is made between the shaft and the casing.

40 45 The detachable cover 24 has a recess 28 in which is mounted a plain bearing 29 for the stub shaft 21. The bearings 29 and 41 may, if desired, be of the ball or roller type.

50 55 The stator 18 is formed with a foot 30 and inlet and outlet ports 31 and 32 are arranged at appropriate points on the periphery of the stator. The rotor 11 is eccentrically mounted in the bore of the stator 18 and during its rotation both ends of the sliding vane 17 are in contact with the bore of the stator. The ends of the vane 17 act in known manner as the rotor 11 rotates, to draw fluid through the inlet port 31 and discharge it through the outlet port 32.

60 65 In the event of grit or solid bodies being drawn into the pump along with the fluid and remaining therein without being forced out through the outlet port 32, the grit or solid bodies can lodge in say the depression 19 in advance of the end of the vane 17 which is just closing the outlet port 32 and be carried through the point at which the

periphery of the rotor 11 makes contact with the bore of the stator 18 without jamming and without damaging the rotor or the stator and will have a further opportunity of being washed through the outlet port 32 on the next or on a subsequent passage of the depression 19 past the opening of the outlet port 32.

70 75 Among advantages shown by the above construction over known constructions (e.g. as shown in British Patent Specification No. 591,553) are:—

80 1. Avoiding the setting-up and machining of the recess of a stuffing box, which is always a matter requiring time and precision, as the recess must be true with the shaft.

85 2. The total length normally required for a stuffing box can be added to the bearing surface or subtracted from the total length of the pump, whichever is more advantageous for the particular application.

90 95 3. The great simplicity in fitting and maintenance, with the elimination of the main difficulty in sealing a shaft, i.e. pressure put on to the packing in a stuffing box by too heavy use on a spanner in tightening the presser pad adjusting nuts, resulting in over-heating of the shaft, loss of lubricating properties in the packing itself and consequent scoring of the shaft.

#### WHAT I CLAIM IS:—

1. A rotary pump of the kind having a rotatable shaft extending outwardly through a bearing in a pump casing and having 100 means for effecting a seal around the shaft where it leaves the casing which means are located wholly outside the compass of the casing and comprise a separable cap attached to the casing and through which the shaft projects, which cap houses and supports flexible sealing means having two annular sealing lips of which one is urged by fluid pressure from within the pump into sealing engagement with the shaft outside 110 the casing and the other is urged by the fluid pressure into sealing engagement with the outside surface of the casing around the shaft.

115 2. A rotary pump as claimed in claim 1 in which the sealing engagement with the casing is against a face thereof perpendicular to the axis of the shaft.

120 125 3. A rotary pump of the kind comprising a stator having inlet and outlet ports, a rotor eccentrically mounted in the stator, an input shaft connected to the rotor and extending outwardly through a bearing in the stator, means for effecting a seal around the shaft where it leaves the stator and a vane received within a diametral slot in the rotor, the diametrically opposite edges of the vane being in contact with the interior surface of the stator and

the vane thereby sweeping the space between the stator and the rotor during rotation of the rotor to draw fluid through the inlet port and to expel it through the outlet port which pump is characterised in that the sealing means are located wholly outside the compass of the stator and comprise a separable cap attached to the stator and through which the shaft projects, which cap houses and supports flexible sealing means having two annular sealing lips of which one is urged by fluid pressure from within the pump into sealing engagement with the shaft outside the casing and the other is urged by the fluid pressure into sealing engagement with the outside surface of the casing around the shaft.

5. A rotary pump as claimed in claim 3 in which the means which make sealing engagement with the shaft also make sealing engagement with the outside surface of the stator around the shaft.

10. A rotary pump having means for effecting a seal around a shaft where it leaves a pump casing or stator substantially as hereinbefore described with reference to and as shown in Figures 1 and 3 of the accompanying drawings.

15. A rotary pump substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

4. A rotary pump as claimed in claim 3 in which the means which make sealing engagement with the shaft also make sealing engagement with the outside surface of the stator around the shaft.

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1 SHEET

COMPLETE SPECIFICATION

This drawing is a reproduction of  
the Original on a reduced scale

Fig. 1.

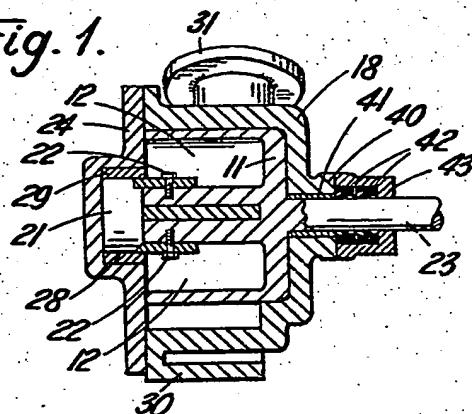


Fig. 2.

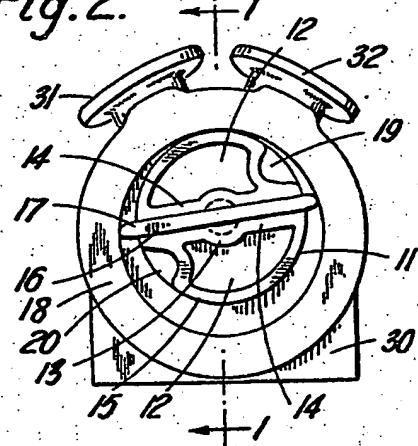


Fig. 3.

